Mapping Criteria: Discussion and Proposed Recommendations

DISCUSSION

Selecting suitable areas for development of offshore wind energy is a multifaceted and multidisciplinary process. In an effort to determine the geographic areas that might accommodate future offshore wind power development in Michigan, Executive Order No. 2009-1 calls on the Great Lakes Wind Council to:

> Identify criteria for identifying and mapping areas that should be categorically excluded from offshore wind development as well as those areas that are most favorable to such development, and provide these criteria in a report to the governor by September 1, 2009.

The criteria developed by the council are intended to serve as guidelines for the selection and evaluation of sites for wind energy development in Michigan's Great Lakes. Categorical exclusion areas are defined as bottmomlands that are off-limits for development due to existing state and federal laws that provide for other exclusive uses (e.g., navigation channels, airport buffers, military operation areas). Areas of low suitability are defined as those areas that are subject to one or several other criteria not deemed categorical exclusions (e.g., harbors/marinas, large river mouths, fish spawning sites). Areas of low suitability may still have potential for development, but are likely to involve high levels of mitigation to offset potential impacts. Detailed site analysis will be a function of the permitting process regardless of where a development is proposed.

It should be noted that while categorical exclusion and/or the placement of restrictions that creates low suitability areas may reduce Michigan's 38,000 square miles of Great Lakes bottomland by only a relatively small percentage, other limiting factors such as water depth may significantly diminish available area at this time. However, the proposed siting criteria and mapping approach is designed to increase public support and developer interest. For example, it protects existing viewsheds around national parks and will decrease a developer's cost by flagging low suitability sites that will require additional study.

The council agreed not to limit mapping criteria based on technical or economic development arguments and decided to focus on the criteria that will allow offshore wind development to advance in the near term while leaving opportunity for technological advancements and acknowledging the need for development of some additional data sources. The council agreed that a work group of the council should determine recommendations for the mapping criteria and a relative weighting process for the criteria. Given the inherent complexities and subjectivity of ascribing weighting values to various mapping criteria, the approach offered here recommends that the buffer zone (statute miles), or setback, for a particular criterion, become the determining factor when mapping suitable areas. Because offshore wind development is a relatively new concept in the Great Lakes basin, a good starting point is to draw upon prior approaches and build

upon the experience of other jurisdictions that have examined the potential for wind energy in offshore areas. Thus, approaches utilized in other jurisdictions and identified criteria (e.g., Ohio, Ontario) provided much of the basis for staff-recommended criteria in Michigan. The list of the criteria identified in this document is designed to facilitate work group discussion and help select criteria that will be used to determine site suitability for offshore wind energy development in Michigan.

The mapping criteria agreed to by the work group will be presented to the full council on June 10 for adoption. It is anticipated that the council may suggest and discuss additional criteria not listed.

In this document, mapping criteria are assembled into five categories:

- Base features (e.g., shipping lanes)
- Biological (e.g., fish spawning sites)
- Physical (e.g., bathymetry)
- Protected Features/Areas (e.g., National park lakeshore)
- Other (e.g., commercial fishing areas)

The recommended criteria are also separated into a two-tiered classification system to distinguish between types of data currently available. Tier I criteria are supported by data sets collected by trained and knowledgeable professionals and volunteers using standardized methodologies. When available, data sets developed by panels of scientific experts and subjected to rigorous peer review have been incorporated as Tier I data layers. NOTE: Tier I data layers may/do require updated data sets (e.g., fish spawning areas). Tier II criteria include those that require significant additional resources to build a data layer for purposes of suitability mapping in the offshore area.

For the purposes of this activity, the work group is not expected to address fine-scale detail about mapping criteria; it is charged to anticipate and then accept expert detailed agency input during the permitting process (in coming years).

RECOMMENDED SUITABILITY MAPPING CRITERIA

	Description	Tier	Buffer	Categorical exclusion	Source
Base features					
Coastal airports	An FAA-registered facility for purposes of passenger and commercial air traffic within 10 miles of coast	I	FAA guidelines for tall structures	Yes	FAA
Confined disposal sites	A facility or area specifically for the disposal of contaminated dredged sediment	I	0.5 mile	No	Work group
Harbors/ marinas	A state-licensed marina and/or harbor of refuge	I	5 miles	No	Work group

	Description	Tier	Buffer	Categorical exclusion	Source
International and state boundaries	Legal land boundary between two state and provisional jurisdictions	I	0.5 mile	Yes	Work group
Islands	Great Lakes islands provide nesting habitat for a number of state-listed threatened and endangered bird species, support a number of state-listed plant and invertebrate species, and serve as valuable migration stopover locations in migration.	I	3–6 miles	No	MDNR
Military operation areas	Land-based areas utilized for military exercises with protected airspace. These are areas of caution where military craft may be operating and firing artillery rounds.	I	No siting pursuant to federal guidelines	Yes	Ohio
Shipping lanes, dredged harbor channels	A designated path through open water used for commercial freight vessel passage and so noted on a nautical chart.	I	>= 1 mile	Yes	Helimax (1000 m = .6 miles)
Transmission lines	Existing submerged telecommunications, oil, gas, electrical distribution lines	I	Utilize industry siting standards and safety guidelines	Yes	Work group
Wind resource	Geographic areas identified by wind resource maps with high potential production (i.e., > 8 m/s @ 70m height)	I	0	No	Helimax (> 8 m/s “favourable”)
Biological features					
Zone of High Biological Productivity	More rigorous study will be required during nearshore permitting.	I	≥ 3 miles	No	Work group
Bird nesting sites/major flyways/ stopovers	A geographically defined area recognized as a significant pathway and/or bird stopover site for “critical” species and species of concern	I	≥ 5 miles	No	Ohio, work group

	Description	Tier	Buffer	Categorical exclusion	Source
Recreational fish spawning sites and refuges	Documented substrate by state or federal authorities where fish spawning occurs for sensitive species and/or "species of recovery."	I – Lake Whitefish and Lake Trout II – Other species	≥ 1 mile	No	Ohio (reefs, shoals, 1 nautical mile)
Globally or continentally significant concentrations of bird or bat species of conservation concern	Bird and bat use sites identified using nationally or internationally recognized criteria, such as through the Important Bird Areas Program, developed to protect rare species.	I	≥ 5 miles	No	MDNR
Habitat for Threatened and Endangered Species	Habitat necessary to the conservation of rare species of wildlife, including Element Occurrences of state-listed species and critical habitat for federally listed species.	I	≥ 5 miles	No	MDNR
Very high concentrations of birds or bats on at least a seasonal basis	Sites including significant stopover locations, off-shore waterfowl foraging areas, documented migration and travel corridors, nesting locations of colonial birds, and flight routes into bat hibernacula	I	≥ 5 miles	No	MDNR
Physical features					
Bathymetry	Depth from water's surface to substrate directly below	I	N/A*	No	Helimax (>5 m -<30m = 16.4 – 98.4feet)
River mouth	The end of a river or tributary where it enters a Great Lake (use Lakebed Alteration Tool definition of river mouth)	I	≥ 5 miles	No	Work group
Shoreline visibility buffer	The fringe of land at the edge of a Great Lake	I	≥ 3 - 6 miles**	No	Work group, Delaware
Predominant Substrate Type	Stratum type or layer (e.g., cobble) lying beneath the water's surface	II	0	No	

	Description	Tier	Buffer	Categorical exclusion	Source
Protected features/areas					
Ceremonial use properties (referred to Bottomland work group)					
National park lakeshore	U.S. Department of Interior designation	I	≥ 13 miles	No	Work group
State bottomland preserves	Michigan's 12 underwater preserves	I	0	No	Work group
Shoreline parks and wilderness areas	State, county, and locally designated parks with contiguous shoreline, including areas managed for waterfowl production and hunting	II	≥ 6 miles	No	Work group
Shipwrecks	State-recognized and mapped shipwrecks	I	0.5 mile	No	Helimax (500 m = 0.31 miles), staff
Underwater archeological sites***	State-recognized areas of archeological significance (determined case-by-case)	II	TBD	No	Helimax (500 m = .31 miles), staff
Other					
Commercial fishing areas	Tribal and non-tribal licensed fishing sites based on reported fish harvest locations	I	0.5 miles	No	MDNR

SOURCES: Wind Turbine Placement Favorability Analysis Map, April 2009. Ohio Department of Natural Resources, Office of Coastal Management, 105 West Shoreline Drive, Sandusky, Ohio; Analysis of Future Offshore Wind Farm Development in Ontario, April 2008. Prepared for Ontario Power Authority by Helimax Energy Inc., April 2008.
* A 50 meter contour is being utilized for mapping purposes merely to illustrate areas within current industry technological capability.
** University of Delaware researchers found public acceptance of offshore wind turbine visibility increased significantly when survey respondents were shown simulations of developments beginning at a distance of approximately 6 miles from shore. After about 10 years of offshore wind siting experience, British authorities recently issued a guidance including a precautionary coastal exclusion zone ranging in size from 8 km to13 km wide (5 to 8 miles) to reduce the visual impact of development and to avoid sensitive, shallow water feeding areas for certain species of sea ducks. In 2007, a Danish siting committee recommended several suitable development areas, all of which were at least 8 miles from shore. (The mapping work group decided to separate visibility from habitat concerns)
*** This may never be fully mapped.

Michigan GIS Lakebed Alteration Tool

The Lakebed Alteration Decision Support Tool highlighted at the April 23 council meeting may be used to assist in the mapping effort. It currently contains numerous data layers from a variety of sources that can be used to map areawide offshore wind suitability. With the recognition that the tool has limitations and is currently a work-in-progress, its developers have offered to assist the council with suitability mapping. In some cases, criteria and the data layers that support them are not currently as robust and exhaustive as they could be to identify suitable areas. However, this mapping tool

provides a strong foundation for the council's work and can quickly illustrate the impact of proposed criteria during work sessions. Staff from the Institute for Fisheries Research, developer of the tool, will attend the June 10 council meeting to display various combinations of mapping criteria and mapping suitability.

While most of the data layers are considered adequate for areawide planning, there is a recognized need for continuing refinement of site-specific data when siting any particular offshore project. It is envisioned that the council will help shape future development of the tool and its data inputs through its recommendation of criteria.

Another topic for the work group's consideration is the challenges inherent to integrating multiple sources of data when some data are private or proprietary. The work group should formally acknowledge this issue and recommend that sensitive data be maintained as such by the proper authorities.